

CHAPTER - II

WATER HARVESTING – OUR AGE OLD TRADITION

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2.0 HISTORICAL OVERVIEW

India is a country with very deep historical roots and strong cultural traditions. These are reflected in our social fabric and institutions of community life. In spite of social movements of varied nature through the millennia we have retained the spirit and essence of these traditions and have remained attached to our roots. Some of our traditions, evolved and developed by our forefathers thousands of years ago have played an important role in different spheres of life. Most important among these is the tradition of collecting, storing and preserving water for various uses.

It all started at the dawn of civilization with small human settlements coming up on the banks of rivers and streams. When due to vagaries of nature the rivers and streams dried up or the flow dwindled, they moved away to look for more reliable sources of water. In due course of time large settlements came up along perennial rivers that provided plentiful water. As the population increased, settlements developed into towns and cities and agriculture expanded, techniques were developed to augment water availability by collecting and storing rain water, tapping hill and underground springs and water from snow and glacier melt etc. Water came to be regarded as precious and its conservation and preservation was sanctified by religion. Various religious, cultural and social rituals prescribed, inter alia, purification and cleansing with water. Water itself had many applications in different rituals. Development of reliable sources of water like, storage reservoirs, ponds, lakes, irrigation canals etc. came to be regarded as an essential part of good governance. Emperors and Kings not only built various water bodies but also encouraged the village communities and individuals to build these on their own. Wide-ranging laws were made to regulate their construction and maintenance and for conservation and preservation of water and its proper distribution and use.

2.1 MYTHOLOGY AND FOLKLORE

Our ancient religious texts and epics give a good insight into the water storage and conservation systems prevailing in those days. For instance, the sage Narad during his visits to different kingdoms would invariably enquire about the state of the ponds and other water bodies and whether these had enough water for the population. In the Ramayana, Lord Hanuman is wonder struck by the beauty and grandeur of Lanka especially its well-maintained lakes, baolis, wells, gardens, orchards and forests.

In our villages there are countless stories from mythology, folklore and songs extolling the glory of our sacred rivers and lakes. The story of Bhagirath single handedly training the mighty Ganga has been told from generation to generation.

By all accounts, there was no water problem in those days and every household could meet its minimum water requirements through these rudimentary local water collection and management measures. It was this basic infrastructure, which served as the foundation for building large and powerful empires. World history, as indeed our own, is replete with instances of rise and fall of empires and civilizations as a direct result of the strength or

weakness of this foundation. Let us go back in time and take a quick view of the entire water scenario in a historical perspective, ponder over the present water crisis and draw lessons for future course of action.

2.2 INDUS VALLEY CIVILIZATION

In India, the first major human settlements started in the Indus Valley (3000-1500 B.C.) in the north and western India. Evidence of water systems is found in different writings of this period. There are archaeological evidence of irrigation and drinking water supply systems from a large number of wells with brick lining. Dholavira, an important site of Indus Valley had several reservoirs to collect rain water. Similar evidences have been found at Mohanjodaro and Harappa. In Lothal (Gujarat) and Inamgaon (Maharashtra) and other places in north and western India small bunds were built by the local people to store rain water for irrigation and drinking.

2.3 MAURYAN EMPIRE

The Arthashastra of Kautilya gives an extensive account of dams and bunds that were built for irrigation during the period of the Mauryan Empire. The water supply systems were well managed within the framework of strict rules and regulations. Different types of taxes were collected from the cultivators depending upon the nature of irrigation. The tax rate was 25% of the produce in respect of water drawn from natural sources like rivers, tanks and springs. For water drawn from storages built by the King the tax rate varied according to the method of drawing water. For instance, it was 20% of the produce for water drawn manually, 25% for water drawn by bullocks and 33% for that diverted through channels. Exemptions from payment of water rates were given for building or improving irrigation facilities. The period of exemption was 5 years for new tanks and bunds, 4 years for renovating old works and 3 years for clearing the works over-grown with weeds.

Water bodies like reservoirs, bunds and tanks were also privately owned and the owner was free to sell or mortgage them. The owner could also sell water to others in return for a share of the produce. In the absence of the owner, the water bodies were to be maintained by the people of the village. A set of punishments were prescribed for various violations of water laws like :

- ♦ Causing damage to another's ploughed or sown field by letting water overflow from a tank/ reservoir.
- ♦ Causing damage to gardens, parks and bunds.
- ♦ Owner of the higher tank preventing the filling of the lower tank.
- ♦ Failure to maintain the water body.
- ♦ Out-of-turn drawing of water from a tank.
- ♦ Building a well or a tank on someone else's land.
- ♦ Selling or mortgaging a water body meant for charitable purposes.
- ♦ Death penalty was prescribed for breaking a reservoir or tank full of water.

2.4 DEVELOPMENT DURING 1ST CENTURY B.C. AND 15TH CENTURY A.D.

The Satvahanas (1st Century B.C.-2nd Century A.D.) introduced the brick and ring wells. Lake and well irrigation was developed on a large scale during the time of Pandya, Chera and Chola dynasties in south India (1st-3rd Century A.D.) and large structures were built across

Cauvery and Vaigai rivers. Irrigation tanks were built, many of these by developing large natural depressions. Water resources development on a large scale took place during the Gupta era (300-500 A.D.). In the south, the Pallavas expanded the irrigation system in the 7th Century A.D. The famous Cauvery anicut was built during this period. Large-scale construction of tanks (Tataka) for tapping rain water was also done in Tamil Nadu. The Chola period (985-1205 A.D.) witnessed the introduction of quite advanced irrigation systems, which brought about prosperity in the Deccan region. This included not only anicuts across rivers and streams but also chain-tanks i.e. a number of tanks with connecting channels. This new system was more reliable in terms of water availability and provided better flexibility in water distribution.



Cauvery Anicut

The Rajput dynasty (1000-1200 A.D.) promoted irrigation works in northern India. The 647 sq.km Bhopal lake was built under King Bhoja. In eastern India Pal and Sen Kings (760-1100 A.D.) built a number of large tanks and lakes in their kingdoms. Rajtarangini of Kalhana gives a detailed account of irrigation systems developed in the 12th Century in Kashmir.

In the Medieval period, Mohammad Bin Tughlaq (1325-1351 A.D.) encouraged the farmers to build their own rain water harvesting systems and wells. Feroze Shah Tughlaq (1351-1388 A.D.) built the Western Yamuna Canal in 1355 to extend irrigation facilities in the dry land tracts of the present-day Haryana and Rajasthan. Emperor Shahjahan built many canals prominent among these being the Bari Doab or the Hasli Canal. Under the rule of Rangila Muhammad Shah, the Eastern Yamuna Canal was built to irrigate large tracts in Uttar Pradesh.

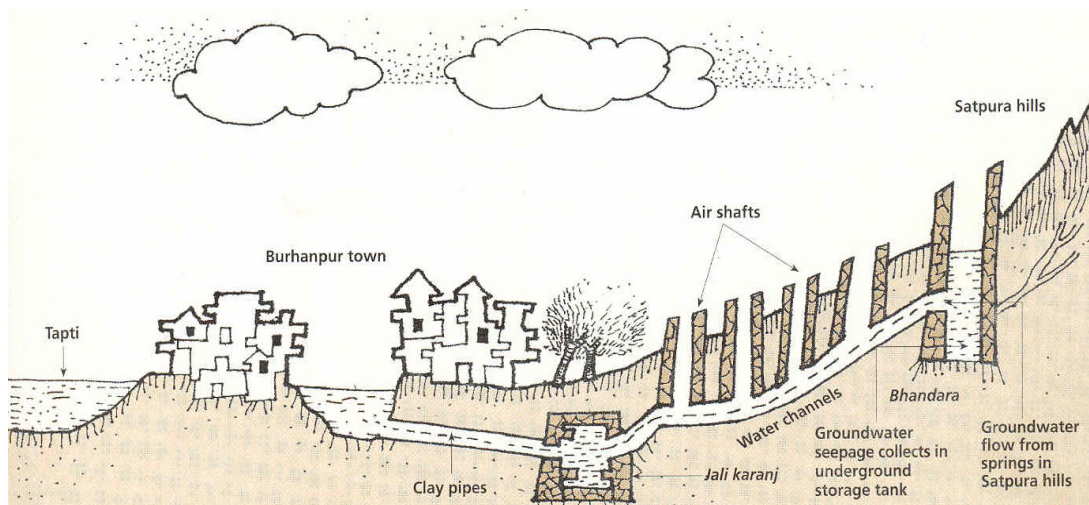
The Vijaynagar Kingdom (1336-1546 A.D.) in the south took keen interest in building large and small storage tanks. Anantraj Sagar tank was built with a 1.37 km long earthen dam across the Maldevi river. The well-known Korangal dam was built under King Krishnadevraya. The Bahamani rulers (1388-1422 A.D.) introduced canal irrigation for the first time in the eastern provinces of the Deccan. Sultan Zain Uddin (1420-1470 A.D.) introduced extensive network of canals in Utpalpur, Nadashaila, Bijbihara and Advin areas of Kashmir.

2.5 WATER FOR DOMESTIC USE

Though the large number of reservoirs and tanks built in different times by the Kings, village communities and individuals were mainly for irrigation, these also provided water for the cattle and domestic use either directly or indirectly through charging of wells. In fact, wells were invariably built close to the tanks, lakes, canals etc. In the arid and semi-arid areas of northwest India, rain water was collected in underground storage tanks called Tanka, Kunds or Kundis. However, the first known construction of a Kund was in 1607 by Raja Sur Singh in village Vadi-Ka-Melan. In 1755, Maharaja Udai Singh built a large Kund in his fort at Jodhpur. Subsequently, during the famine of 1895-96 construction of these storage structures was taken up on a large scale.

The city of Delhi, founded in the early eleventh century near the present Suraj Kund in Haryana, used to get its water supply from Suraj Kund, which was built to impound rain water from the Aravalli hills. During the Sultanate period that followed, several cities were built in the vicinity of the Aravallis and all these had elaborate rain water harvesting systems to meet the domestic water requirements. The prominent among these is the Hauz-e-Sultani built by Sultan Iltutmish (1210-1236 A.D.).

In 1615, during the Mughal rule, Abdul Rahim Khan built a unique water supply system of the Burhanpur town (Madhya Pradesh). The system involved construction of long lines of underground tunnels with vertical airshafts to tap the underground water flow from the nearby Satpura hill ranges to the Tapi river lower down. The system is still functioning well and is adequate to meet the entire water requirements of the town.



Engineering Marvel of Burhanpur



Air Shaft in Original Condition (left) and after repair (right)



Series of Air Shafts



Horizontally Dug Water Channels (Tunnels)



Villagers use these Air Shafts like wells as water flows through the tunnels throughout the year

During 4th and 8th Century Dasmatisagar was built near Titlagarh in Orissa. During the same period two large reservoirs were built in Mayurbhanj district. The erstwhile Patna state also had 6 major reservoirs for water supply. All these were zealously maintained and cattle grazing and agriculture were not permitted in their vicinity.

Under the Nizam Shahi Kings (1490-1635 A.D.) 15 channels were built to supply water to the city of Ahmadnagar from deep wells at the foot of the nearby hills. Similar systems were built by various Kings for the towns of Vadgaon, Junnar, Karad etc.

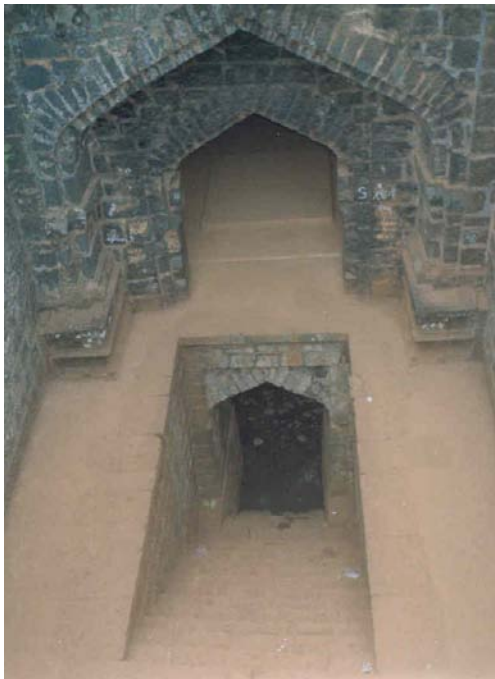
In the low rainfall areas of present-day Karnataka a large number of tanks were built during the 15th Century for both irrigation and drinking water, prominent among these were the Kempambudhi, Dharmambudhi, Sampangi and Siddikatte Kere tanks built by Kempe Gowda.

The city of Hyderabad (Andhra Pradesh) has a glorious tradition of tanks built by its ruler Mohammad Quli Qutub Shah in the 16th Century. The first source of water supply to the town was the Hussain Sagar lake built by Hussain Shah Wali in 1562. In the hills near Daulatabad, two reservoirs were built by the Hindu Kings, in ancient times to meet the water requirements of the city.

A number of tanks were built in Palanpur, Ahmedabad, Bharuch, Surat and Vadodara areas of Gujarat during the 15th Century for both irrigation and drinking water.

2.6 WATER FOR FORTS AND PLACES OF WORSHIP

All forts, built in different terrains and climatic conditions, had elaborate arrangements for drinking water. Those built on hilltops or in rocky terrain depended mainly on rain water harvested from surrounding hills. The Amber Fort near Jaipur built about three centuries ago is a classic example of such a system. It has an automatic arrangement for desilting and aeration of harvested rain water before its entry into the large storage tank. The Jodhpur fort in western Rajasthan had water harvesting arrangements to tap both rain water and groundwater. The Panhala Fort of Maharaj Shivaji built on a hillock near Kolhapur in Maharashtra had Baolis and wells to tap underground springs originating in nearby higher hill slopes. The fort at Chittor on top of a hill has a large reservoir formed from the harvested waters of springs.



Baolis to tap underground springs in Panhala Fort

At the Buddhist site of Sanchi (Madhya Pradesh) dating back to the 3rd Century B.C., there are three ancient tanks to store rain water from the hill slopes.



Ancient Tanks on the Buddhist site of Sanchi dating back to the 3rd Century B.C.

Most of the old temples in south India built centuries ago have large tanks in their premises. These tanks are either fed by harvested rain water or by tapping underground springs. In Tamil Nadu alone there are 39 temple tanks with areas varying from 0.25 to 3 hectares. These are all fed by rain water. Though these were used mainly for bathing and religious purposes, these also recharged the drinking water wells.



Spring Water Harvesting in Fort of Chittor



Baori Constructed in the Fort of Raisen

2.7 ROLE OF COMMUNITIES AND INDIVIDUALS

In those days, centuries ago, the state built only large storages essentially for irrigation and water supply for the capital cities and important towns. These were obviously not enough and therefore the village communities and individuals were encouraged to build their own water harvesting devices to meet their basic domestic requirement of water. The communities being closely knit had a strong culture of providing voluntary labour and material contributions for building these facilities for the common good. The social norms for civilized behaviour, interalia, enjoined on the community members to maintain these facilities, conserve and protect water from pollution and ensure its equitable and fair distribution.

Social scientists, historians and scholars have found that there was no problem of water scarcity where the community organizations were strong and the people relied upon their own efforts to build water harvesting structures. On the other hand, the situation was bad where the people depended entirely on the state for water.

2.8 LESSONS FROM HISTORY

This in short, is the history of our glorious tradition of water harvesting by the village communities and individuals with strong support and encouragement from the state. More importantly this history reflects the ingenuity and wisdom of our forefathers who made harvesting of water and its management an integral part of the native culture and community life. This meant that these practices were perceived by the common man as his sacred duty and by the communities as part of good local self-governance and social responsibility. This Water-Wisdom at all levels of society ensured adequate availability of water for all, which in turn, formed the basis for all round development and prosperity. Let us revive and expand this old wisdom for the benefit of all our people especially in the rural areas. We can do it.